

We claim:

1. A lead-free optical glass having a refractive index n_d of $1.55 \leq n_d \leq 1.60$, an Abbe number v_d of $54 \leq v_d \leq 63$ and a transformation temperature $T_g \leq 500^\circ\text{C}$, said glass comprising a composition, in percent by weight, based on oxide content, of:

P_2O_5	43 - 56
ZnO	21 - 36
Al_2O_3	0 - 6
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Na_2O	0.5 - 16
K_2O	0 - 8
$\Sigma\text{M}_2\text{O}$	≤ 16
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MgO	0 - 5
CaO	0 - 5
BaO	3 - 14
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B_2O_3	0 - 8
La_2O_3	0 - 7.

2. The lead-free optical glass as defined in claim 1, containing from 0.5 to 7 percent by weight of said La_2O_3 .

3. The lead-free optical glass as defined in claim 1, and free of arsenic.

4. The lead-free optical glass as defined in claim 1, containing, in percent by weight, as refining agent, at least one of: from 0 to 1 percent by weight, Sb_2O_3 ; from 0 to 1 percent by weight, SnO ; from 0 to 1 percent by weight, NaCl ; from 0 to 1 percent by weight, SO_4^{2-} ; and from 0 to 1 percent by weight, F^- .

5. A lead-free optical glass having a refractive index n_d of $1.56 \leq n_d \leq 1.59$, an Abbe number v_d of $55 \leq v_d \leq 62$ and a transformation temperature $T_g \leq 500^\circ\text{C}$, said glass comprising a composition, in percent by weight, based on oxide content, of:

P_2O_5	44 - 55
ZnO	22- 32
Al_2O_3	0 - 5
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Na_2O	5 -15
K_2O	0 - 8
$\Sigma\text{M}_2\text{O}$	≤ 15
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MgO	0 - 5
CaO	0 - 5
$\Sigma \text{MgO}+\text{CaO}$	≤ 8
BaO	4 - 13
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B_2O_3	0 - 8
La_2O_3	0.5 - 5.

6. The lead-free optical glass as defined in claim 5, and free of arsenic.

7. The lead-free optical glass as defined in claim 5, containing, in percent by weight, as refining agent, at least one of: from 0 to 1 percent by weight, Sb_2O_3 ; from 0 to 1 percent by weight, SnO ; from 0 to 1 percent by weight, NaCl ; from 0 to 1 percent by weight, SO_4^{2-} ; and from 0 to 1 percent by weight, F^- .

8. A lead-free optical glass having a refractive index n_d of $1.56 \leq n_d \leq 1.59$, an Abbe number v_d of $55 \leq v_d \leq 62$ and a transformation temperature $T_g \leq 450^\circ\text{C}$, said glass comprising a composition, in percent by weight, based on oxide content, of:

P_2O_5	46 - 53
ZnO	24 - 31
Al_2O_3	0 - 3
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Na_2O	6 - 13
K_2O	0 - 6
$\Sigma \text{M}_2\text{O}$	≤ 13
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MgO	0 - 4
CaO	0 - 4
$\Sigma \text{MgO} + \text{CaO}$	≤ 5
BaO	4 - 11
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B_2O_3	0 - 5
La_2O_3	0.5 - 4.

9. The lead-free optical glass as defined in claim 8, and free of arsenic.

10. The lead-free optical glass as defined in claim 8, containing, in percent by weight, as refining agent, at least one of: from 0 to 1 percent by weight, Sb_2O_3 ; from 0 to 1 percent by weight, SnO ; from 0 to 1 percent by weight, NaCl ; from 0 to 1 percent by weight, SO_4^{2-} ; and from 0 to 1 percent by weight, F^- .

11. A lead-free optical glass having a refractive index n_d of $1.56 \leq n_d \leq 1.59$, an Abbe number v_d of $55 \leq v_d \leq 62$ and a transformation temperature $T_g \leq 400^\circ\text{C}$, said glass comprising a composition, in percent by weight, based on oxide content, of:

P_2O_5	48 - 51
ZnO	25 - 29
Al_2O_3	0.5 - 2.5
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Na_2O	7 - 12
K_2O	0 - 4
$\Sigma \text{M}_2\text{O}$	≤ 12
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MgO	0 - 3
CaO	0.5 - 3.5
$\Sigma \text{MgO} + \text{CaO}$	≤ 3.5
BaO	5 - 10
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La_2O_3	0.5 - 3.5

12. The lead-free optical glass as defined in claim 11, and free of arsenic.

13. The lead-free optical glass as defined in claim 11, containing, in percent by weight, as refining agent, at least one of: from 0 to 1 percent by weight, Sb_2O_3 ; from 0 to 1 percent by weight, SnO ; from 0 to 1 percent by weight, NaCl ; from 0 to 1 percent by weight, SO_4^{2-} ; and from 0 to 1 percent by weight, F^- .

14. An optical element comprising a lead-free glass as defined in claim 1.